

Synthesis and characterization of calcium phosphate compounds with strontium and magnesium ionic substitutions [Síntesis y Caracterización de Compuestos de Fosfato de Calcio con Substituto Iónico de Estroncio y Magnesio]

Rabelo Neto J.S.

Knopf T.B.

Fredel M.C.

Olat S.

de Moraes P.H.

Bioceramics offer advantages in the repair and regeneration of hard tissues and are used as bone void fillers and particulate fillers in bone cements with surgical applications. Regeneration and osteosynthesis stimulation via the release of essential ions such as strontium (Sr^{2+}) and magnesium (Mg^{2+}) is a relatively new field. Therefore, there is great interest in investigating various ionic substitutions on crystallographic structure and characteristics for use in osteoporosis prevention and increase bone formation and decrease bone resorption. In this study, we synthesize calcium phosphate samples with Sr^{2+} and Mg^{2+} ionic substitutions. The samples are characterized using X-ray diffraction, Fourier transform infrared spectroscopy, and inductively coupled plasma mass spectroscopy. Hydroxyapatite, beta tricalcium phosphate, and amorphous phases were observed. Depending on the ionic substitution, the crystal size and crystallinity varied from 22 nm to 130 nm and from 84% to 99.6%, respectively. The Ca/P ratio ranged from 0.72 to 1.82. The results demonstrated the effect of Sr^{2+} and Mg^{2+} inclusions in calcium phosphate on important parameters used in several bioceramic applications. © 2015, International Journal of Morphology. All rights reserved.

Bioceramics

Biomaterials

Calcium phosphate

Hydroxyapatite

